

CLAIMS:

1. A backscatter communication system comprising:  
an interrogator including a transmitter configured to output a forward link communication and a receiver configured to receive a return link communication having a carrier signal, the receiver being configured to reduce the amplitude of the carrier signal of the return link communication; and  
a communication device configured to modulate the carrier signal to communicate the return link communication responsive to reception of the forward link communication.
2. The backscatter communication system according to claim 1 wherein the communication device comprises a radio frequency identification device.
3. The backscatter communication system according to claim 1 wherein the communication device comprises a remote intelligent communication device.
4. The backscatter communication system according to claim 1 wherein the carrier signal comprises a continuous wave signal.
5. The backscatter communication system according to claim 1 wherein the interrogator comprises a coherent interrogator.

1           6.     The backscatter communication system according to claim 1  
2 wherein the transmitter is configured to apply a local continuous wave  
3 signal to the receiver, and the receiver is configured to receive the  
4 local continuous wave signal, adjust the amplitude and phase of the  
5 local continuous wave signal to provide an adjusted continuous wave  
6 signal, and sum the adjusted continuous wave signal with the return link  
7 communication.

8  
9           7.     The backscatter communication system according to claim 6  
10 wherein the receiver is configured to match the amplitude of the local  
11 continuous wave signal with the amplitude of the return link  
12 communication.

13  
14           8.     A backscatter system interrogator comprising:  
15           a receiver configured to receive a return link communication  
16 comprising a modulated continuous wave signal comprising a radio  
17 frequency continuous wave signal having a first frequency and a  
18 modulation signal having a different frequency, the receiver being further  
19 configured to reduce the amplitude of the return link communication at  
20 the frequency of the radio frequency continuous wave signal.

1           9.    The backscatter system interrogator according to claim 8  
2 further comprising a transmitter configured to output a forward link  
3 communication, the radio frequency continuous wave signal and a local  
4 continuous wave signal.

5  
6           10.   The backscatter system interrogator according to claim 9  
7 wherein the receiver and transmitter are coherent.

8  
9           11.   The backscatter system interrogator according to claim 9  
10 wherein the receiver is configured to receive the local continuous wave  
11 signal, adjust the amplitude and phase of the local continuous wave  
12 signal to provide an adjusted continuous wave signal, and sum the  
13 adjusted continuous wave signal with the modulated continuous wave  
14 signal.

15  
16           12.   The backscatter system interrogator according to claim 11  
17 wherein the receiver is configured to match the amplitude of the local  
18 continuous wave signal with the amplitude of the modulated continuous  
19 wave signal.

20  
21           13.   The backscatter system interrogator according to claim 9  
22 wherein the transmitter and receiver are configured to communicate with  
23 a radio frequency identification device.

24

1           14. A coherent backscatter system interrogator comprising:  
2           a transmitter configured to communicate a wireless forward link  
3           communication, a wireless continuous wave signal and a local continuous  
4           wave signal; and  
5           a receiver configured to receive the local continuous wave signal  
6           from the transmitter and wireless return link communications comprising  
7           modulated continuous wave signals, the receiver being configured to  
8           reduce the amplitude of the return link communications using the local  
9           continuous wave signal received from the transmitter.

10  
11           15. The coherent backscatter system interrogator according to  
12           claim 14 wherein the transmitter and receiver are configured to  
13           communicate with a radio frequency identification device.

14  
15           16. The coherent backscatter system interrogator according to  
16           claim 14 wherein the receiver is configured to receive the local  
17           continuous wave signal, adjust the amplitude and phase of the local  
18           continuous wave signal to provide an adjusted continuous wave signal,  
19           and sum the adjusted continuous wave signal with the modulated  
20           continuous wave signal.

1           17. The coherent backscatter system interrogator according to  
2 claim 16 wherein the receiver is configured to match the amplitude of  
3 the local continuous wave signal with the amplitude of an individual  
4 modulated continuous wave signal.

5  
6           18. The coherent backscatter system interrogator according to  
7 claim 14 wherein the wireless continuous wave signal and the local  
8 continuous wave signal have a common frequency, and the receiver is  
9 configured to reduce the amplitude of the return link communications  
10 at the common frequency.

11  
12           19. A method of communicating in a backscatter system  
13 comprising:

14           transmitting a forward link communication;

15           transmitting a wireless continuous wave signal;

16           receiving the forward link communication;

17           modulating the wireless continuous wave signal responsive to the  
18 receiving the forward link communication, the modulating providing a  
19 modulated continuous wave signal;

20           receiving the modulated continuous wave signal; and

21           reducing the amplitude of the modulated continuous wave signal.

1           20. The method according to claim 19 wherein the transmitting  
2 the wireless continuous wave signal comprises transmitting the wireless  
3 continuous wave signal at a frequency and the reducing comprises  
4 reducing the amplitude of the modulated continuous wave signal at the  
5 frequency.

6  
7           21. The method according to claim 19 wherein the transmitting  
8 the wireless continuous wave signal comprises transmitting at a first  
9 frequency and the modulating comprises modulating the wireless  
10 continuous wave signal using a subcarrier signal having a second  
11 frequency.

12  
13           22. The method according to claim 21 wherein the reducing  
14 comprises reducing the amplitude of the modulated continuous wave  
15 signal at the first frequency.

16  
17           23. The method according to claim 19 wherein the transmittings  
18 individually comprise transmitting using an interrogator and the  
19 modulating comprises modulating using a radio frequency identification  
20 device.

21  
22           24. The method according to claim 19 wherein the modulating  
23 comprises selectively reflecting the wireless continuous wave signal.  
24

1           25. The method according to claim 19 further comprising  
2 providing a local continuous wave signal and the reducing comprises  
3 reducing the amplitude using the local continuous wave signal.  
4

5           26. The method according to claim 25 wherein the reducing  
6 comprises:

7           matching the amplitude of the local continuous wave signal with  
8 the amplitude of the modulated continuous wave signal;

9           adjusting the phase of the local continuous wave signal following  
10 the matching; and

11           summing the local continuous wave signal and the modulated  
12 continuous wave signal following the adjusting.  
13

14           27. The method according to claim 26 wherein the adjusting  
15 comprises searching for a phase which provides maximum reduction of  
16 the amplitude of the modulated continuous wave signal at a frequency  
17 of the wireless continuous wave signal.  
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1           28. A backscatter communications method comprising:  
2           transmitting a forward link communication and a wireless  
3           continuous wave signal using an interrogator;  
4           receiving the forward link communication using a remote  
5           communication device;  
6           communicating a return link communication comprising a modulated  
7           continuous wave signal responsive to the receiving the forward link  
8           communication, the communicating including modulating the wireless  
9           continuous wave signal using the remote communication device;  
10          receiving the modulated continuous wave signal using the  
11          interrogator; and  
12          reducing the amplitude of the modulated continuous wave signal  
13          using the interrogator.

14  
15          29. The method according to claim 28 wherein the  
16          communicating comprises reflecting the wireless continuous wave signal  
17          using a subcarrier signal.

18  
19          30. The method according to claim 28 wherein the  
20          communicating comprises modulating the wireless continuous wave signal  
21          providing a carrier component and side band components.

22  
23          31. The method according to claim 30 wherein the reducing  
24          comprises reducing the amplitude of the carrier component.



1           32. The method according to claim 31 wherein the reducing  
2 comprises substantially maintaining the amplitude of the side band  
3 components during the reducing.  
4

5           33. The method according to claim 28 wherein the transmitting  
6 comprises transmitting the wireless continuous wave signal at a frequency  
7 and the reducing comprises reducing the amplitude of the modulated  
8 continuous wave signal at the frequency.  
9

10          34. The method according to claim 28 wherein the receiving the  
11 forward link communication comprises receiving using a radio frequency  
12 identification device.  
13

14          35. The method according to claim 28 wherein the transmitting  
15 comprises transmitting radio frequency signals.  
16

17          36. The method according to claim 28 further comprising  
18 providing a local continuous wave signal and the reducing comprises  
19 reducing using the local continuous wave signal.  
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1           37. A coherent backscatter communication method comprising:  
2           transmitting a wireless forward link communication;  
3           transmitting a continuous wave signal;  
4           providing the continuous wave signal as a local signal;  
5           receiving the wireless forward link communication;  
6           communicating a wireless return link communication including  
7           modulating the continuous wave signal following the receiving;  
8           receiving the wireless return link communication; and  
9           reducing the amplitude of the wireless return link communication  
10          using the local signal.

11  
12          38. The method according to claim 37 wherein the  
13          communicating comprises reflecting the transmitted continuous wave  
14          signal.

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16          39. The method according to claim 37 wherein the  
17          communicating comprises modulating the continuous wave signal providing  
18          a carrier component and side band components.

19  
20          40. The method according to claim 39 wherein the reducing  
21          comprises reducing the amplitude of the carrier component.

1           41. The method according to claim 40 wherein the reducing  
2 comprises substantially maintaining the amplitude of the side band  
3 components during the reducing.

4  
5           42. The method according to claim 37 wherein the transmitting  
6 a continuous wave signal comprises transmitting a continuous wave signal  
7 having a frequency and the reducing comprises reducing the amplitude  
8 of the modulated continuous wave signal at the frequency.

9  
10          43. The method according to claim 37 wherein the receiving the  
11 wireless forward link communication comprises receiving using a radio  
12 frequency identification device.

13  
14          44. The method according to claim 37 wherein the transmittings  
15 individually comprise transmitting radio frequency signals using an  
16 interrogator.

1           45. A method of communicating within a coherent backscatter  
2 communication system, the method comprising:

3           outputting a forward link communication;

4           outputting a wireless continuous wave signal;

5           providing a local continuous wave signal;

6           communicating a modulated continuous wave signal responsive to  
7 the outputting the forward link communication;

8           receiving the modulated continuous wave signal; and

9           reducing the amplitude of the modulated continuous wave signal  
10 including:

11           matching the amplitude of the local continuous wave signal  
12 with the amplitude of the received modulated continuous wave signal;

13           adjusting the phase of the local continuous wave signal  
14 following the matching providing an adjusted continuous wave signal; and

15           summing the adjusted continuous wave signal with the  
16 modulated continuous wave signal.

17  
18           46. The method according to claim 45 wherein the adjusting  
19 comprises searching for a phase which provides maximum reduction of  
20 the amplitude of the modulated continuous wave signal at a frequency  
21 of the wireless continuous wave signal.

22  
23           47. The method according to claim 45 wherein the  
24 communicating comprises reflecting the wireless continuous wave signal.

1           48. The method according to claim 45 wherein the outputtings  
2 individually comprise transmitting using an interrogator and the  
3 communicating comprises communicating using a radio frequency  
4 identification device.

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6           49. The method according to claim 45 wherein the  
7 communicating comprises modulating the continuous wave signal providing  
8 a modulated continuous wave signal having a carrier component and side  
9 band components.

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11           50. The method according to claim 49 wherein the reducing  
12 comprises reducing the amplitude of the carrier component.

13  
14           51. The method according to claim 50 further comprising  
15 substantially maintaining the amplitude of the side band components  
16 during the reducing.

1           52. A method of reducing power within a modulated return link  
2 continuous wave signal of a coherent backscatter communication system  
3 including an interrogator and a remote communication device, the  
4 method comprising:

5           transmitting a radio frequency forward link communication;

6           transmitting a radio frequency continuous wave signal having a  
7 first frequency;

8           providing a local continuous wave signal having the first frequency;

9           receiving the radio frequency forward link communication;

10          modulating the radio frequency continuous wave signal following  
11 the receiving the radio frequency forward link communication, the  
12 modulating comprising reflecting the radio frequency continuous wave  
13 signal using a modulation signal having a second frequency and  
14 providing a modulated continuous wave signal having a carrier  
15 component and plural side band components;

16          receiving the modulated continuous wave signal; and

17          reducing the amplitude of the carrier component of the modulated  
18 continuous wave signal including:

19                matching the amplitude of the local continuous wave signal  
20 with the amplitude of the modulated continuous wave signal;

21                adjusting the phase of the local continuous wave signal  
22 following the matching; and

23                summing the local continuous wave signal and the modulated  
24 continuous wave signal following the adjusting.